Patent Application No. 09/670,489

IN THE CLAIMS:

Please amend claims 2, 4, 9 and 11-13 and cancel claims 1 and 8 as follows:

Claim 1. (canceled)

Claim 2. (currently amended)   A ~~The~~ data compression apparatus ~~according to claim 1,~~ for encoding data and for compressing the encoded data comprising:

  a grammar storage unit for storing grammar rules for a tree local
5 language in which data are represented by a labeled tree structure;
  an encoder for reading a document written in said tree local language, for dividing said document into a structure part and contents, and for encoding said structure part using said grammar rules stored in said grammar storage unit; and
10 a compressor for compressing said contents of said document extracted by said encoder; and
  wherein said encoder includes:
  a divider for dividing a target document into a structure part and contents;
15 an automata constructor, for constructing pushdown automata that correspond to said grammar rules; and
  an encoded data generator, for employing said pushdown automata that are constructed by said automata constructor to perform syntax analyzation of said structure part of said document that is obtained by
20 said divider, and for generating an encoded data string for said structure part.

Claim 3. (original)   That data compression apparatus according to claim 2, wherein said encoded data generator of said encoder assigns symbols to choices resident in said pushdown automata that are constructed by said automata constructor; and wherein said encoded data
5 generator employs said pushdown automata to analyze said structure part of said document written in said tree local language, and outputs, at the location of the selected choices, said symbols that are assigned for said choices, so that the encoded data string for said structure part is generated.

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Claim 4. (currently amended)   The data compression apparatus according to claim 2 1, wherein said compressor performs compression and encoding not only for said contents of said document written in said tree local language, but also for said structure part of said

5 document that is obtained by said encoder.

Claim 5. (withdrawn)

Claim 6. (currently amended)   A database system for storing and managing data in a storage unit comprising:

a grammar storage unit for storing grammar rules for a tree local language in which data are represented by a labeled tree structure;

5 an encoder for reading a document written in said tree local language, for dividing said document into a structure part and contents, and for encoding said structure part using said grammar rules stored in said grammar storage unit;

a compressor for compressing said contents of said document

10 extracted by said encoder and for encoding the compressed contents; and

a storage unit for storing said structure part of said document encoded by said encoder, and for storing said contents of said document that are compressed and encoded by said compressor; and

wherein said encoder includes:

15 a divider for dividing said document into said structure part and contents;

an automata constructor, for constructing pushdown automata that correspond to said grammar rules; and

an encoded data generator, for employing said pushdown automata

20 that are constructed by said automata constructor to perform syntax analyzation of said structure part of said document that is obtained by said divider, and for generating an encoded data string for said structure part.

Claim 7. (original)   The database system according to claim 6, wherein said compressor performs compression and encoding not only for said contents of said document written in said tree local language, but also for said structure part of said document that is obtained by said

5 encoder.

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Claim 8. (canceled)

Claim 9. (currently amended)   A ~~The~~ data compression method ~~according to claim 8,~~ for encoding data and for compressing the encoded data comprising the steps of:

reading a document written in a tree local language in which data
5 are represented by a labeled tree structure, and dividing said document into a structure part and contents;

encoding said structure part using grammar rules for said tree local language; and

compressing said contents of said document extracted by said
10 encoder; and

wherein said step of encoding said structure part of said document includes the steps of:

constructing pushdown automata that correspond to said grammar rules;
15 assigning symbols to choices resident in said pushdown automata;

employing said pushdown automata to analyze said structure part of said document in accordance with the depth-first searching, and to output, at the locations of said choices, said symbols that are assigned to said choices; and
20 outputting a symbol string that is obtained by employing said pushdown automata as encoded data strings of said structure part of said document that is written in said tree local language.

Claim 10. (original) The data compression method according to claim 9, further comprising:

a step, to be performed before said step of encoding said structure part of said document written in said tree local language and
5 when an attribute belongs to a node of a target document in said tree local language, of changing said attribute to a child node of an element possessing said attribute so as to convert said grammar rules of said tree local language and said document into a tree structure that is to be processed by said pushdown automata.

Claim 11. (currently amended) The data compression method according to claim 9 ~~8~~, further comprising: a step, to be performed after said step of encoding said structure part of said document, of

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employing another general-purpose compression ~~and encoding~~ method to
5   further compress ~~and encode~~ said encoded structure part of said
document.

Claim 12. (currently amended)   A storage medium on which input
means of a computer stores a computer-readable program, said program
permitting said computer to perform:
a process for reading a document written in a tree local language
5   in which data are represented by a labeled tree structure, and for
dividing said document into a structure part and contents;
a process for encoding said structure part using said grammar
rules of said tree local language; and
a process for compressing said contents of said document extracted
10   by said encoder ~~and for encoding the compressed contents~~; and
wherein the process for encoding said structure part includes:
an automata constructing process, for constructing pushdown
automata that correspond to said grammar rules; and
an encoded data generator process for employing said pushdown
15   automata that are constructed by said automata constructing process to
perform syntax analyzation of said structure part of said document and
for generating an encoded data string for said structure part.

Claim 13. (currently amended)   A program transmission apparatus
comprising:
storage means for storing a program that permits a computer to
perform
5   a process for reading a document written in a tree local language
in which data are represented by a labeled tree structure, and for
dividing said document into a structure part and contents,
a process for encoding said structure part using said grammar
rules for said tree local language, and
10   a process for compressing said contents of said document extracted
by said encoder ~~and for encoding the compressed contents~~; and
transmission means for reading said program from said storage
means, and for transmitting said program; and
wherein the process for encoding said structure part includes:
15   an automata constructing process, for constructing pushdown

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automata that correspond to said grammar rules; and

    an encoded data generator process for employing said pushdown automata that are constructed by said automata constructing process to perform syntax analyzation of said structure part of said document and

20   for generating an encoded data string for said structure part.